AGNICO EAGLE

MEADOWBANK MINE

Application for Amendment NWB License 2AM-MEA0815

Freshwater Consumption

APRIL 2013

EXECUTIVE SUMMARY

Meadowbank's current NWB License (2AM-MEA0815) permits Agnico Eagle Mines Ltd. (AEM) to obtain 700,000 m^3 per year of fresh water for domestic camp use, mining, milling and associated uses. Despite significant success at engineering solutions to optimize fresh water use, requirements are projected to continue to exceed the permitted rate. Increased fresh water use is due to higher than anticipated rates of ore processing, and an adjustment of the initial water balance model, resulting in a deficit of reclaimed water. As a result, AANDC has recommended that AEM apply for a license amendment.

In April 2013, AEM updated their water balance based on unexpected problems with reclaim water use. Under the maximum use scenario, fresh water requirements for the mill in 2013 would be 1,608,104 m^3, or 184 m^3/h on average. In the remaining years of operation (2014 – 2018), fresh water use would be lower, as reclaimed water usage returns to maximum capacity. Under the maximum use scenario, total fresh water requirements for the mill in 2014 – 2018 would be 1,080,000 m^3/yr, or 123 m^3/h on average. In addition, 50,000 m^3/yr are required for the camp, and 2,400 m^3/yr are required for the emulsion plant.

Based on the situations described above, AEM is requesting an amendment to NWB License 2AM-MEA0815, Part E, Item 3, to permit the withdrawal of 1,870,000 m^3/yr in 2013, and 1,150,00 m^3/yr thereafter, for domestic camp use, mining, milling and associated uses. No significant impacts to the local aquatic ecosystem are anticipated as a result of the requested increase in fresh water use, because the total volume withdrawn for mining under maximum use for 2010 – 2018 would be less than 2.5% of the volume of Third Portage Lake.

Nevertheless, AEM is developing an action plan to further reduce fresh water withdrawal by using attenuation pond water for mill processing and tailings deposition. The requested fresh water withdrawal rates are therefore considered to represent a conservative worst case scenario, in the case that the planned reductions are not successful.

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ᑕᒪᓐᓇ ᐃᒪᖅᑐᕐᓂᖅ ᑕᐅᑐᒃᓗᒍ, ᐊᒡᓂᑯ ᐃᑯ ᐅᔭᕋᒃᑕᕆᐊᑦ ᓚᐃᓴᑦ ᐃᒪᖅᑐᕐᓂᖓ ᐊᕐᑭᕐᑯᔭᙵᑦ, ᓇᓗᓇᐃᖁᑕᓕᒃ NWB License 2AM-MEA0815, Part E, Item 3, ᐃᒪᖅᑐᓕᕋᔭᖅᓗᑎᒃ ᑕᓯᕐᒥᑦ 1,870,000 m3, 2013ᒥ, ᐊᒪᓗ 1,150,000 m3 ᐅᑭᐅᓂ ᓯᕗᓂᕐᒥ, ᐊᑐᒐᒃᓴᓂᒃ ᐊᐳᖅᑎᓐᓇᖅᑐᒥ, ᐅᔭᕋᒃᑕᕐᕕᒃᒥ, ᐅᔭᕐᑭᕆᕕᒃᒥ ᐊᒪᓗ ᐊᓯᙱᓄᑦ. ᐃᒪᕐᒥᒃ ᐊᑐᓗᐊᑲᓂᕐᓂᐊᖅᑎᓗᒋᑦ ᐊᕙᑎ ᐃᒪᕐᒧ ᓄᓇᓗ ᓱᓂᓚᙱᑐᖅ. ᐊᕙᑎ ᓱᓂᓗᐊᓚᙱᑐᖅ ᐃᒪᖅ ᑯᕕᔭᐅᑲᓂᕐᓂᖓ 2.5% -ᙴᓇᔭᕐᒪᑦ, ᐊᖏᓂᖓ, ᐊᐳᖅᑎᓐᓇᖅᑐᑉ ᑕᓯᐊᓂᑦ Third Portage ᑕᓯᕐᒥᑦ.

ᐊᒡᓂᑯ ᐃᑯ ᐅᔭᕋᒃᑕᕆᐊᑦ, ᐃᓱᒪᓕᐅᑲᓂᖅᑐᑦ ᖃᓄᖅ ᐃᒪᖅᑐᓗᐊᙱᓇᔭᕐᒪᖔᑕ, ᐃᒪᕐᒥᒃ ᐊᑐᑲᓂᕐᓗᑎᒃ ᑲᑎᖅᓱᐃᕕᒃᒥᑦ, ᐃᒪᕐᒥᒃ ᐊᑐᖅᓯᒪᔪᒥᒃ, ᑕᒪᓇᓗ ᐊᑐᕋᔭᖅᓗᓂ ᐅᔭᕐᑭᕆᕕᒃᒥ. ᐃᒪᖅ ᐊᑐᖅᓯᒪᔪᖅ ᑲᑎᖅᓱᐃᕕᒃᒥ ᐊᑐᒐᐅᑲᓂᕐᓂᙵ, ᒥᑭᓗᐊᖅᐸᑦ, ᑕᒪᓐᓇ ᐃᒪᕐᒥᒃ ᐊᑐᑲᓂᕐᓂᖅ ᐊᕐᑭᓂᓗᒐᑦ, ᐃᒪᐅᑉ ᐊᑐᕐᓂᖓ ᐃᓱᒪᕆᔭᐅᑦᓯᐊᕐᒪᑦ.

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Version	Date	Section	Page	Revision
1	April 5, 2013	All	All	Draft for internal review

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Agnico Eagle Mines Limited- Meadowbank Division

1 INTRODUCTION

1.1 Background

The current terms of Meadowbank's NWB License (2AM-MEA0815) permit Agnico Eagle Mines Ltd. (AEM) to obtain fresh water from Third Portage Lake for domestic camp use, mining, milling and associated uses (Part E, Item 1). Part E, Item 3 indicates that the total volume of fresh water for all uses shall not exceed 700,000 m^3 per year. This fresh water consumption allowance was requested during the Water License hearing process in 2008, and was based on conceptual mine plans and a site-wide water balance model developed during the project's detailed engineering phase.

Since operation at Meadowbank began in 2010, AEM has re-used water from the tailings slurry for mill processing. This reclaimed water has accounted for the majority of the mill's water intake (73% in 2012), with the balance obtained from ore water (1 % in 2012) and fresh water (26 % in 2012). Significant success at engineering solutions to optimize fresh water use (a reduction from 46 m^3/tonne processed in Q3 2010 to 22 m^3/tonne in Q4 2012; see Figure 1.1), was accomplished in 2012 (see letter sent to NWB January 3 2012). An updated water management plan (SNC Lavalin, 2013) was finalized in March, 2013. This plan indicated that insufficient water would be available from the reclaim pond beginning in May, 2013, to continue pumping at the rate required (370 m^3/h) to maintain fresh water use at the permitted level of 80 m^3/h. This is mainly due to higher than anticipated rates of ore processing, and an adjustment of the initial water balance model resulting in a deficit of reclaimed water, as described in Section 2.2.

1.2 Reasons for an Amendment Application

AEM is applying for an amendment to the Type A License (2AM-MEA0815) for the following reasons:

- The revised site wide water management plan (SNC Lavalin, 2013) notes a deficit in reclaim starting in 2013.
- Recent issue with reclaim barge has caused a temporary increase in fresh consumption until barge repaired in Aug 2013.
- Despite freshwater reductions, AEM has exceeded the license limit for the last 3 years; following an inspection in March and July, 2012, AANDC recommended applying for an increase to the allowable usage of fresh water.

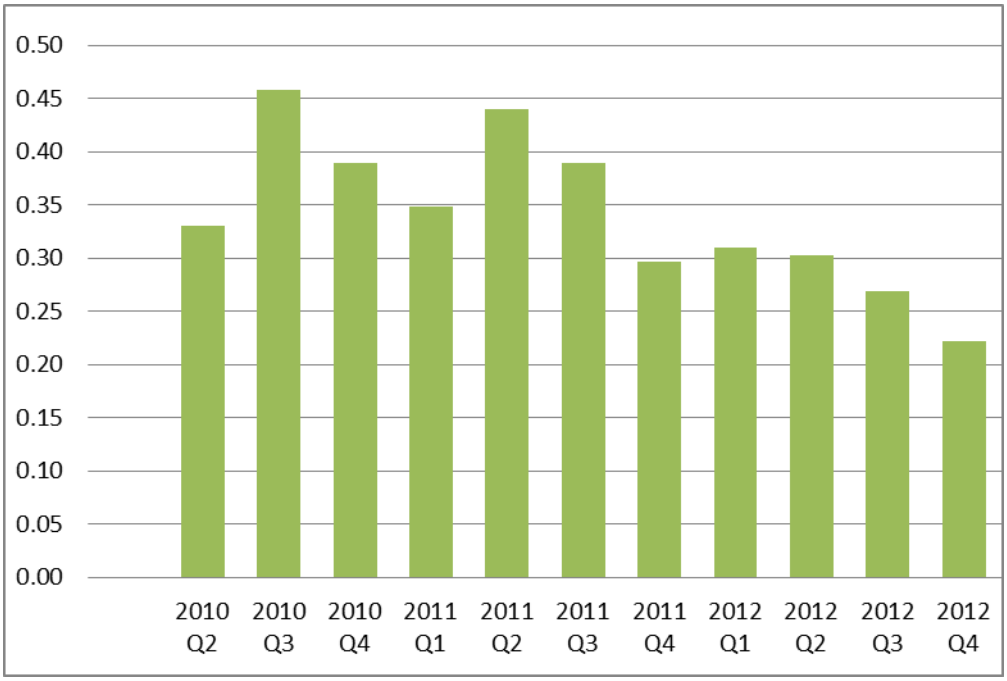

Figure 1.1 – Fresh water use (m^3/tonne processed) by the Meadowbank mill.

1.3 Meadowbank Mine Overview

Since 2009, AEM has operated the Meadowbank Gold Mine, which is located 75 km north of the Hamlet of Baker Lake, Nunavut. The Meadowbank mine consists of several gold-bearing deposits that will be mined until 2017. Mining at Meadowbank is planned to occur in three open pits (Goose Pit, Portage Pit and Vault Pit), two of which are currently operational (Portage Pit and Goose Pit). Much of the pit development is located in close proximity to the mill, office and lodging infrastructure, with the exception of the Vault Pit which is approximately 10 km northeast of the main minesite.

1.4 Location and Description of Key Water Management Features

Figure 1.2 indicates the major water use and management features described in this document. Mill processing and associated operations use the greatest amount of freshwater onsite (90%). However, the majority of Meadowbank mill water requirements (73% in 2012) were obtained from recycled water in the tailings slurry, which is currently being deposited in the North Cell of the Tailings Storage Facility (TSF). Tailings water is ponded ("reclaim pond") within the TSF and pumped from the reclaim barge to the mill. The South Cell of the TSF is currently in use as the attenuation pond, where contact water, mainly from pit dewatering, is stored prior to treatment and discharge to Third

Portage Lake (monitoring location ST-9). Fresh water is obtained from Third Portage Lake (monitoring location ST-1) to make up the balance of mill and camp requirements.

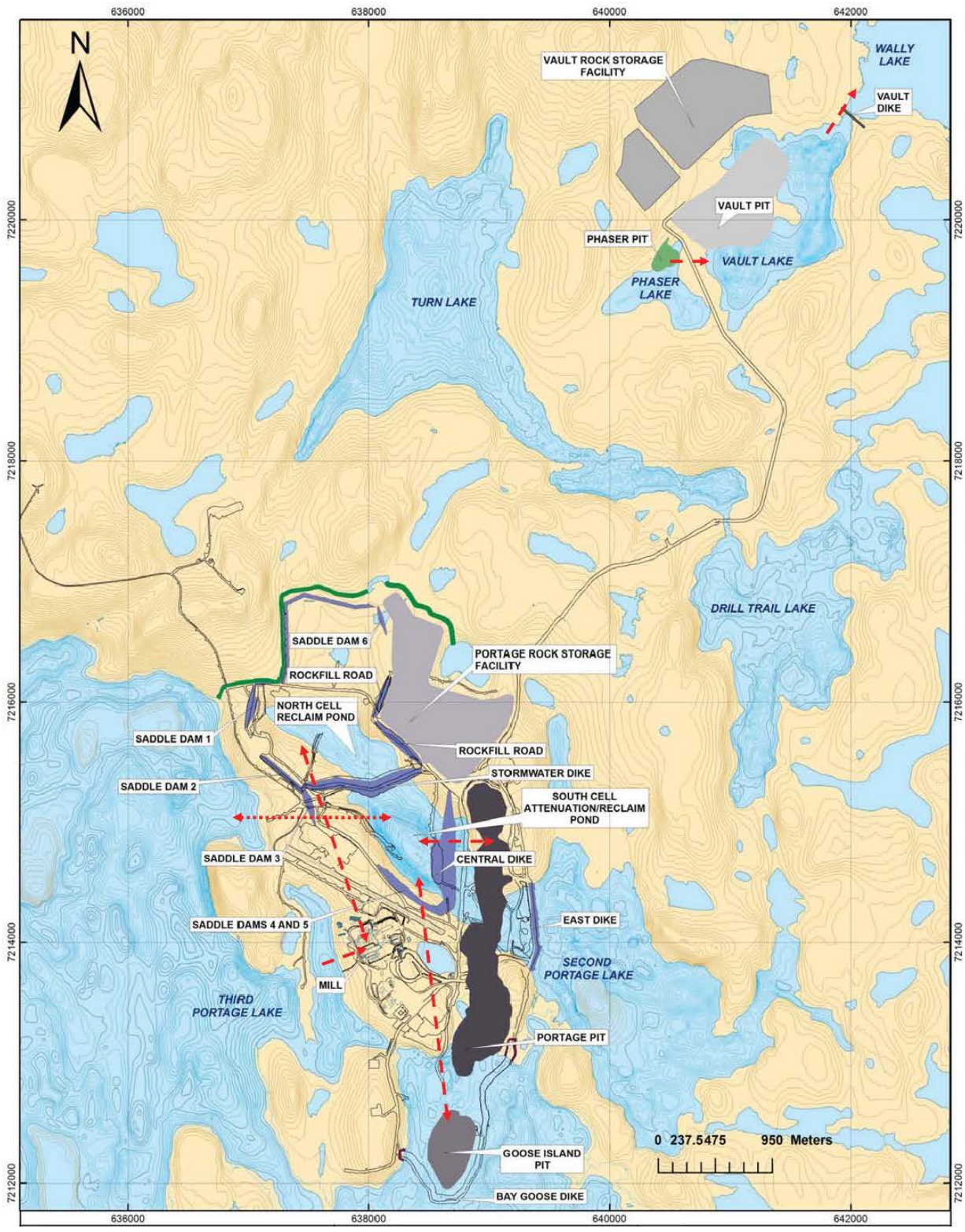

Figure 1.2 – Major water use and management features at Meadowbank Mine Site.

2 FRESH WATER USE

2.1 Summary of Past Water Use

Initial modelled estimates of fresh water consumption (Cumberland, 2005) indicated that at peak production, Meadowbank's mill would require approximately 60 m^3/hr of fresh water and would use 237 m^3/hr of reclaimed water from the tailings slurry. As a result, a permit was obtained (NWB license 2AM-MEA0815; June 9, 2008), allowing for the use of, or 700,000 m^3/yr of fresh water (equivalent to 80 m^3/hr).

In July, 2009, an Updated Water Management Plan was prepared which described water management, infrastructure, water balance, and water quality and monitoring, based on up-to-date mine development plans. Use of fresh water in 2009 (site construction) was 36,451 m^3.

Milling began in January 2010, and freshwater use rates were higher than expected (approximately 120 m^3/hr). The primary causes of this increase in fresh water consumption above the design value (80 m^3/hr) were as follows:

1. The theoretical water balance assumed that water from the south section of the Second Portage Arm would be used as make-up water (fresh water). This water could not be used because of the Total Suspended Solids (TSS) content and the fact that the supply would not be constant during the year.
2. The density of the final tailings slurry was lower than expected. The initial design called for a combined tailings slurry density of 50.8% solids by weight. During severe winter conditions it was determined that the low density was problematic for pumping. As a result the final combined tailings slurry density was adjusted to 35% solids to ensure that the slurry could be pumped to the tailings containment area with sufficient velocity to prevent sanding in the tailings pipeline.
3. As well, it was determined that the theoretical water balance did not account for water requirements during mill shutdown. To keep the equipment in good condition a minimal quantity of fresh water is required when the mill is shut down.
4. Lastly, water consumption for the wash bay at the truck shop was not included in the original water balance. Since then, it has been estimated that approximately 300,000 m^3/year of fresh water is required to wash all the vehicles on site.

In consideration of this, an Updated Water Management Plan was presented as a technical memorandum in September 2010. Total freshwater use in 2010 was 1,050,000 m^3 (120 m^3/hr). As a result, the original water management models and the 2010 technical memorandum were further re-evaluated in 2011. A new water management plan was initiated, but the mine development plans underwent a significant change, including a decrease in the life of mine (LoM) from 2020 to 2017, so the plan was not finalized. Works to reduce fresh water consumption in 2011 included decreasing water used in the truck wash bay and increasing use of reclaim water. Although production increased from 2,030,000 tonnes milled in 2010 to 2,980,000 tonnes in 2011, total freshwater use remained relatively steady at 1,090,000 m^3.

A new water management plan was commissioned in 2012. During this year, AEM worked diligently to reduce fresh water consumption by re-evaluating all of the processes using fresh water at the mill, as well as tailings deposition plans and water retention rates in the tailings (see letter to NWB 12/09/21). Significant reductions were achieved, despite a further increase in production to 3,820,911 tonnes milled. Although total fresh water usage in 2012 (1,040,000 m^3) was still above the permitted level, rates were low enough after implementation of the action plan (90 m^3/h in December, 2012) that the target of 700,000 m^3 was expected to be achieved in 2013 (see letter to NWB 01/03/2013).

2.2 Projected Water Use

The updated water management plan (SNC Lavalin, 2013) was finalized in March, 2013. This plan indicated that insufficient water would be available from the reclaim pond beginning in May, 2013, to continue pumping at the rate required (370 m^3/h) to maintain fresh water use at the permitted level of 80 m^3/h. The deficit of reclaimed water compared to previous estimates was found to be mainly due to a reduction in total precipitation, increased production from 8,500 t/day to 11 200 t/day, and unexpected infiltration rather than runoff from the waste rock storage area (Table 2.1).

It should be noted that only 60% of the tailings water can be reclaimed, as the remainder is entrapped as ice lenses and pore water. Thus over time, the available volume of water decreases. In addition, a minimum of 750,000 m^3 of unfrozen water must be maintained in the reclaim pond to ensure proper barge function, proper tailings beach formation and to allow 90 days for stabilization of the supernatant chemistry prior to re-use.

Table 2.1 – Factors leading to predicted deficit in reclaimed water; change from the initial prediction; and associated change in quantity of reclaimed water available.

Factor	Change	Associated Change in Reclaim Water
Total precipitation	15% reduction	- 120,000 m^3/yr
Mill production rate	32% increase	- 960,000 m^3/yr (e.g., 2013)
Rock storage facility runoff	100% reduction	- 25,000 m^3/yr

Estimates of fresh water usage for the Meadowbank mill until closure are provided in the updated Water Management Plan (SNC Lavalin, 2013).

Use rates change by year based on the estimated available volume of reclaim water. For 2013, an average fresh water use rate for the mill of 123 m^3/h was estimated to be required to maintain minimum water levels (750,000 m^3) in the reclaim pond.

2.3 Actual Water Use

The above is estimated to hold true under normal operating conditions. However, in February 2013, the reclaim water barge became unusable as a result of accidental shifting and intake of excess solids (mill slurry). This was also due to an overall lack of water in the reclaim pond. On February 21, 2013, ore processing began using fresh water only. Attempts were made to repair the barge, but were not successful, and due to frozen conditions, repositioning of the barge at this time was not possible. However, the reclaim road has been extended and a diesel pump installed temporarily to obtain reclaim water. As a result of these conditions, fresh water use is anticipated to be higher than predicted in 2013. Table 2.2 shows expected water use for the mill, based on an updated water balance developed by AEM (April, 2013) to account for problems with the reclaim barge.

Table 2.2 – Predicted water use and sources for the Meadowbank mill in 2013, based on current conditions. * indicates maximum pumping rate.

Month	Reclaim Water (m^3/h)	Fresh Water (m^3/h)	TOTAL RATE (m^3/h)
January	361	92	453
February	300	185	484
March	0	474	474
April	225	250	475
May 1 – 16	225	250	475
May 17 - 31	225	250	475
June	225	250	475
July	225	250	475
August	385*	90	475
September	385	90	475
October	385	90	475
November	385	90	475
December	385	90	475

Based on this scenario, total fresh water use for the mill in 2013 would be 1,608,104 m^3, or 184 m^3/h on average.

In the remaining years of operation (2014 – 2018), fresh water requirements for the mill would be lower, as reclaimed water usage returns to maximum capacity. The updated water management plan (SNC Lavalin, 2013, Appendix A.4- freshwater usage sensitivity analysis) indicated that at a fresh water use rate of 120 m^3/h, a slight deficit of reclaim water (< 400,000 m^3) would still occur in 2014 and 2015. However, because of increased fresh water usage in 2013, the available quantity of reclaim water will be higher than predicted in subsequent years. Based on the current scenario, fresh water use at 123 m^3/h (1,080,000 m^3/yr) beginning in 2013 would be sufficient to operate at current production rates without incurring a deficit of reclaim water.

2.4 Additional Fresh Water Requirements

It should be noted that an additional minimum of 40,000 m^3 of fresh water annually are required to be withdrawn from Third Portage Lake for use by the camp (based on 2012 usage). The camp fresh water requirement is therefore calculated at 50,000 m^3/yr (with contingency). In addition, up to 2,400 m^3/yr may be withdrawn from Unnamed Lake for use at the emulsion plant. The current permitted level of 700,000 m^3/yr is based on the total withdrawal from all fresh water sources.

2.5 Amendment Request

Based on the situations described above, AEM is requesting an amendment to NWB License 2AM-MEA0815, Part E, Item 3, to permit the withdrawal of 1,700,000 m^3/yr plus a contingency of 10% for a total of 1,870,000 m^3 in 2013. This amount is for one year only and is considered a special circumstance based on the reclaim barge problem. AEM anticipates that once the reclaim pumping system is functioning properly (August, 2013) that freshwater will be reduced. For subsequent years 2014 thru 2018 AEM is requesting the amount recommended by SNC (that ensures no reclaim pond deficit) plus an addition for camp use which is a total of 1,150,00 m^3/yr.

Section 2.6 discusses a project currently being assessed by AEM to reuse the contact and runoff water in the Attenuation Pond which is normally treated for TSS removal and discharged to Third Portage Lake. If the project proceeds freshwater consumption would be reduced. The requested increases in freshwater amounts represent a conservative scenario whereby no Attenuation Pond water is reused on site.

2.6 Action Plan to Further Reduce Fresh Water Use

As recommended in the updated Water Management Plan (SNC Lavalin, 2013), a strategy is being developed to use the contact water stored in the Portage attenuation pond to supplement fresh water requirements for ore processing and to ensure that there is no deficit of water in the North Cell reclaim pond. The transfer of water from the attenuation area either to the reclaim pond, or directly to the mill would help alleviate the need for increased fresh water use, ensure there would be no deficit in the reclaim pond and assist in tailings deposition beaches. This strategy and engineering assessment is anticipated to be completed during Q2, 2013. The implementation of this project will reduce freshwater consumption below the requested amounts. Another goal of the project is to minimize or eliminate any discharge from the Attenuation Pond to Third Portage Lake.

3 POTENTIAL ENVIRONMENTAL EFFECTS

3.1 Description of Third Portage Lake

The physical characteristics of Third Portage Lake are described in Table 3.1.

Table 3.1 – Physical characteristics of Third Portage Lake.

Characteristic	Value	Description
Surface Area	33 km^2	
Lake Volume	446.2 Mm^3	Based on bathymetry and air photo interpretation
Maximum Depth	40m	In the south basin
Average Depth	6m	During open water
Flow direction	N to Second Portage Lake, then E to Tehek Lake	
Maximum Water Temperature	11.5°	During open water (August, 2002)
	2.5°	With ice cover (May, 2003)

3.2 Effects on Water Levels

The withdrawal of fresh water from a lake has the potential to reduce water levels, which could lead to impacts on the local aquatic ecosystem. AEM has monitored water levels in Third Portage Lake since 2009 at the effluent discharge station, as shown in Figure 3.1. During this time, no substantial change in water levels has been observed. Average fresh water withdrawal rates during operation (2010 – 2012) were 1,061,000 m^3/yr (± 2 %). The initial water level on March 14, 2009 was 133.54 masl, and the latest measured value on April 10, 2012 was 133.39 masl. Since 2009, water levels have fluctuated by less than 80 cm, with a maximum of 134.15 masl (August 6, 2009) and a minimum of 133.35 masl (February 27, 2012).

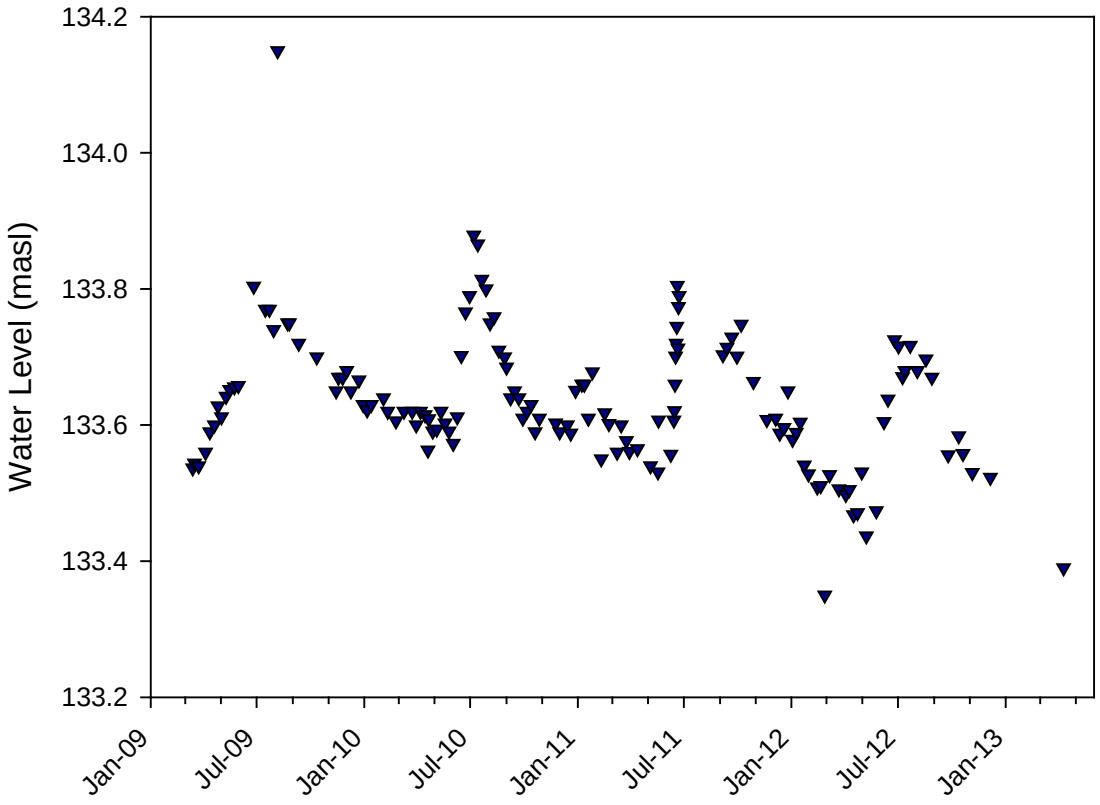

Figure 3.1 – Water level of Third Portage Lake at the effluent discharge location (ST-9).

Cott et al. (2005) suggest that winter water withdrawal rates for lakes greater than 3.5 m deep not exceed 5% of the ice-free water volume in order to avoid causing physiological stress to fish. More recently (e.g. Sibley et al. 2007; Cott et al. 2008) a value of 10% has been suggested as sufficiently protective. At Meadowbank, the total volume of water used in 2009 – 2012 plus the total requested permit volume for 2013 – 2018 (10,666,451 m^3) does not exceed 2.5% of the estimated volume of Third Portage Lake (446,000,000 m^3). Therefore, no significant impacts to the local aquatic ecosystem are anticipated as a result of the requested increase in fresh water use.

3.3 Total Water Requirements from Third Portage Lake

After mining of the Portage deposit, water from Third Portage Lake will be used to re-flood the de-watered basin formed by the Bay-Goose and East Dikes. In the initial project FEIS (Mine Waste and Water Management; Cumberland, 2005), AEM assumed

that the volume of water available annually from Third Portage Lake for re-flooding of the Portage Pit area corresponded to the water level necessary to maintain a minimum flow equal to the average annual (1:2-year return period) 60-day low flow at the outlet of the lake over the four summer months (June through September). This available volume was determined to be 5,300,000 m^3/yr. The updated Water Management Plan (SNC Lavalin, 2013) indicated that re-flooding of the Portage pit area will begin in 2015, with re-flooding until 2023. The planned schedule as described in that document is indicated in Table 3.2. As shown, total drawdown would be 6,030,000 m^3 in 2017 and 2018, if the maximum permitted rate is withdrawn. Pit flooding rates would therefore be adjusted as required to ensure total fresh water demands remain within the calculated available volume. The amount of water for reflooding the pits was included in AEM's original Water License application in 2008.

Table 3.2 – Total fresh water required from Third Portage Lake at maximum requested permit rate.

Year	Requested Rate		Pit Flooding		TOTAL	
	m³ (total)	m³/hr	m³ (total)	m³/hr	m³ (total)	m³/hr
2013	1,870,000	213			1,870,000	213
2014	1,150,000	131			1,150,000	131
2015	1,150,000	131	450,000	51	1,600,000	182
2016	1,150,000	131	360,000	41	1,510,000	172
2017	1,150,000	131	4,880,000	557	6,030,000	688
2018	1,150,000	131	4,880,000	557	6,030,000	688
2019			4,880,000	557	4,880,000	557
2020			4,880,000	557	4,880,000	557
2021			4,880,000	557	4,880,000	557
2022			4,880,000	557	4,880,000	557
2023			360,000	41	360,000	41

4 MONITORING

Aquatic communities in the receiving environment may be impacted if water levels decrease substantially. Monitoring programs will continue to evaluate both the physical and biological components of Meadowbank mine site lakes. This will be done through routine weekly and monthly sampling as per the Type A water license and the Core Receiving Environmental Monitoring Program (CREMP).

4.1 Targeted Water Level Monitoring

Water levels in Third Portage Lake will be monitored monthly at the effluent discharge station in accordance with the Water Quality and Flow Monitoring Plan (to be updated in 2013). Increased freshwater usage in the past has not altered historical water levels in Third Portage Lake which have not declined from the pre-operation (2009) annual average value of 133.68 masl by more than 0.2% (0.33 m). Furthermore, increased water usages have not caused any erosional or water flow changes between Third Portage Lake and Second Portage Lake. Based on past water usage AEM does not anticipate any changes to the water levels or water flows. If water levels or erosional changes are observed, monitoring will be conducted weekly and AEM will initiate a review of the water balance in Third Portage Lake to determine if fresh water use by the mine is a significant contributor, or if declines are due to changes in natural factors (e.g. precipitation) (also see Section 5).

4.2 Core Receiving Environmental Monitoring

The Core Receiving Environmental Monitoring Program (CREMP) is the broad scale program that is aimed at detecting potential impacts due to mining activities at the scale of lakes or basins. It is intended to monitor large-scale basin-wide changes in physical and biological variables to evaluate potential impacts from all mine related stressors to the receiving environment. It therefore serves as the most important monitoring program for evaluating short-term and long-term potential impacts, for which other programs provide additional support and verification.

As discussed in Azimuth (2012), the CREMP study design was based on our understanding of mine construction, operation and infrastructure (e.g., dikes, effluents, stream crossings, roads, etc.) and was developed to detect mine-related impacts at temporal and spatial scales that are ecologically relevant. The program targets general limnology, water and sediment quality, primary productivity (phytoplankton), and benthic community structure. To date, monitoring has been conducted throughout the year where ice conditions permitted.

If reductions in water levels occur, CREMP monitoring will detect any basin-wide effects on water quality and aquatic communities. Sampling stations are located in all three basins of Third Portage Lake, as well as Second Portage and Tehek Lakes, which receive flow from Third Portage Lake. Sampling components include limnology, water and sediment chemistry, phytoplankton, and benthic invertebrate community.

The CREMP monitoring program is an iterative process and the study design is revisited periodically based on accumulated data to ensure the ability of the CREMP to detect impacts to the receiving environment.

5 MITIGATION

5.1 Reuse of Attenuation Pond Water

As described in Section 2.6, AEM aims to further reduce fresh water consumption through incorporation of attenuation pond water directly into mill processing systems, or by transfer to the reclaim pond (which would alleviate any reclaim pond water deficit and assist in tailings deposition). As an example, if the reclaim pond deficit is eliminated through transfer of Attenuation Pond water to the North Cell reclaim pond, then reclaim flow could be maintained at 385 m^3/hr which therefore leads to a freshwater make up flow of 90 m^3/hr (mill use is 470 m^3/hr total). At this flow rate of 90 m^3/hr the total freshwater supply would be 788,400 m^3/yr. It is estimated that this solution could reduce fresh water use by a minimum of 450,000 m^3/yr. AEM expects to begin using attenuation pond water in 2013, but since design plans are not complete, no assumptions are made in calculations for this water license amendment request.

5.2 Water Level and Erosional Changes

As previously described, as per Type A Water License conditions, AEM will monitor water levels on a monthly basis and during open water season evaluate erosional changes in channels between Third Portage Lake and Second Portage Lake. As in the past, if a significant change occurs, AEM will initiate a review of the water balance in Third Portage Lake to determine if fresh water use by the mine is a significant contributor, or if declines are due to changes in natural factors (e.g. precipitation). In addition, if a change occurs due to increased water usage, the frequency of monitoring will increase to weekly and AEM will discuss mitigative options with the NWB and AANDC.

6 REFERENCES

Azimuth (2012). Core Receiving Environmental Monitoring Program (CREMP): Design Document 2012 Meadowbank Mine. Prepared for Agnico-Eagle Mines Ltd. – Meadowbank Division. December 2012

Cott, P.A., Monita, D.M.A., Majesksi, A.R., Hanna, B.W., and K.J. Bourassa. 2005. Application of the NWT Winter Water Withdrawal Protocol with bathymetric profiles of select small lakes in the Mackenzie Delta region. Canadian Manuscript Report for Fisheries and Aquatic Sciences 2731: vii+73 p.

Cott, P.A., Sibley, P.K., Gordon, A.M., Bodaly, R.A., Mills, K.H., Somers, W.M., and G.A. Fillatre. 2008. Effects of water withdrawal from ice-covered lakes on oxygen, temperature and fish. Journal of the American Water Resources Association. Vol. 44, No.2.

Cumberland Resources Ltd. 2005. Mine Waste and Water Management. Part of the Environmental Impact Statement. October, 2005.

Sibley, P.K., White, D.M., Cott, P.A. and M.R. Lilly. 2008. Introduction to water use from arctic lakes: Identification, impacts, and decision support. Journal of the American Water Resources Association. Vol. 44, No.2

SNC Lavalin, 2013. Water Management Plan 2012. Prepared for Agnico-Eagle Mines Ltd. March, 2013.